IN THE CLAIMS:

Please cancel claims 1-16. without prejudice or disclaimer.

Please add new claims 17-36 as follows:

Claims 1-16 (canceled).

17. (new) A method of determining of a physical feature of a medium, comprising the steps of:

producing radiation with a light source (2);

placing a probe on a sample (1) of the medium, the probe comprising a first optical fiber (5) having a first diameter, and at least a second optical fiber (6) having a second diameter;

sending light coming from the light source, through the first optical fiber;

collecting first backscattered radiation through the first optical fiber and second backscattered radiation through the second optical fiber;

producing a first signal (1) based on the first backscattered radiation, and a second signal (J) based on the second backscattered radiation;

determining a measured differential backscatter signal as a function of wavelength using the first and second signals (I, J); and

calculating the physical feature by curve fitting the measured differential backscatter signal to a backscatter function, in which the backscatter function is a function of an average path-length (τ) traveled by detected scattered photons, the average path-length (τ) being independent from an absorption coefficient (μ_a) of the medium, and from a scattering coefficient (μ_s) of the medium.

18. (new) The method according to claim 17, wherein the average path-length (τ) is also independent from a wavelength (λ) of the first and second backscattered radiation.

19. (new) The method according to claim 17, wherein the path-length (τ) is proportional to the first fiber diameter.

20. (new) The method according to claim 17, wherein the backscatter function is given by:

$$R_{bs}=C_1 \cdot \mu_s \cdot \exp(-\tau \cdot \mu_a)$$

with $\tau=C_2 \cdot d_{fiber}$ where C_1 and C_2 are constants, μ_a is the absorption coefficient of the medium, μ_s is the scattering coefficient of the medium, and d_{fiber} is the first fiber diameter.

21. (new) The method according to claim 20, wherein C_2 is approximately 0.6.

22. (new) The method according to claim 17, wherein the physical feature is a concentration of at least one substance in the medium.

23. (new) A device for determining a physical feature of a medium, comprising:

a light source (2) for producing radiation;

a probe with at least a first and a second optical fiber (5, 6), the first optical fiber (5) having a first diameter and being arranged to deliver the radiation on a sample (1) of the medium and to collect first backscattered radiation from the sample (1), the second optical fiber (6) having a second diameter and being arranged to collect second backscattered radiation, wherein the second optical fiber (6) is positioned alongside the first optical fiber (5);

a spectrometer (7) for producing a first signal (1) based on the first backscattered radiation, and for producing a second signal (J) based on the second backscattered radiation; and

a processor (9) arranged to determine a measured differential backscatter signal as a function of wavelength (λ) using the first and second signals (I, J), wherein the processor is arranged to calculate the physical feature by curve fitting the measured differential backscatter signal to a backscatter function (R_{bs}), in which the backscatter function is a function of an average path-length (τ) traveled by detected scattered photons, the average path-length (τ) being independent from an absorption coefficient (μ_a) of the medium, and from a scattering coefficient (μ_s) of the medium.

24. (new) Computer program product to be loaded by a computer, the computer program product, after being loaded, providing the computer with the capacity to:

receive a first signal (1) indicative of a collected radiation received from a first fiber (5) and a second signal (J) indicative of a collected radiation received from a second fiber (6);

determine a measured differential backscatter signal (R_{bs}) as a function of wavelength (λ) of the collected radiation using the first and second signals (I, J); and

calculate a physical feature by curve fitting the measured differential backscatter signal to a backscatter function, in which the backscatter function is a function of an average path-length (τ) traveled by detected scattered photons, the average path-length (τ) being independent from an absorption coefficient (μ_a) of the medium, and from a scattering coefficient (μ_s) of the medium.

25. (new) Data carrier provided with a computer program product according to claim 24.

26. (new) A method of determining a physical feature of a medium, comprising the steps of:

producing radiation with a light source (2);

placing a probe on a sample (1) of the medium, the probe comprising a first optical fiber (5) having a first diameter, and at least a second optical fiber (6) having a second diameter;

sending light coming from the light source, through the first optical fiber;

collecting first backscattered radiation through the first optical fiber and second backscattered radiation through the second optical fiber;

producing a first signal (1) based on the first backscattered radiation, and a second signal (J) based on the second backscattered radiation;

determining a measured differential backscatter signal as a function of wavelength using the first and second signals (I, J); and

calculating the physical feature by curve fitting the measured differential backscatter signal to a backscatter function, in which the backscatter function is a function of a mean free path of photons.

27. (new) The method according to claim 26, wherein the backscatter function (R_{bs}) is defined by:

$$R_{bs}(\lambda) = C_{app}' \cdot p(\lambda,180) \cdot \mu_s(\lambda) \cdot \exp(-2 \cdot mfp(\lambda)) \cdot \sum_{i=1}^{n} \rho_i \cdot \mu_a^{spec,i}(\lambda))$$

where C_{app}' is an apparatus constant, $p(\lambda,180)$ is a phase function, $\mu_s(\lambda)$ is a scattering coefficient of the medium, λ is a wavelength of the first and second backscattered radiation, $mfp(\lambda)$ is the mean free path as a function of the wavelength, n is a number of substances in the medium, ρ_i is concentration of absorber i present in a detection volume of the sample (1), and $\mu_a^{spec,i}(\lambda)$ is an absorption coefficient of substance i as a function of the wavelength.

28. (new) The method according to claim 26, wherein the physical feature is a concentration of at least one substance in the medium.

29. (new) A device for determining a physical feature of a medium, comprising:

a light source (2) for producing radiation;

a probe with at least a first and a second optical fiber (5, 6), the first optical fiber (5) having a first diameter and being arranged to deliver the radiation on a sample (1) of the medium and to collect first backscattered radiation from the sample (1), the second optical fiber (6) having a second diameter and being arranged to collect second backscattered radiation, wherein the second optical fiber (6) is positioned alongside the first optical fiber (5);

a spectrometer (7) for producing a first signal (1) based on the first backscattered radiation, and for producing a second signal (J) based on the second backscattered radiation;

a processor (9) arranged to determine a measured differential backscatter signal as a function of wavelength (λ) using the first and second signals (I, J), wherein the processor is

arranged to calculate the physical feature by curve fitting the measured differential backscatter signal to a backscatter function (R_{bs}), wherein the backscatter function is a function of a mean free path of photons.

30. (new) Computer program product to be loaded by a computer, the computer program product, after being loaded, providing the computer with the capacity to:

receive a first signal (1) indicative for a collected radiation received from a first fiber (5) and a second signal (J) indicative for a collected radiation received from a second fiber (6);

determine a measured differential backscatter signal (R_{bs}) as a function of wavelength (λ) of the collected radiation using the first and second signals (I, J); and

calculate a physical feature by curve fitting the measured differential backscatter signal to a backscatter function, wherein the backscatter function is a function of a mean free path of photons.

31. (new) Data carrier provided with a computer program product according to claim 30.

32. (new) The method according to claim 17, wherein the method further comprises the steps of:

simultaneously measuring backscatter radiation on different locations of the sample (1);

determining a physical feature for the different locations; and

calculating a standard deviation of the physical feature.

33. (new) The method according to claim 23, wherein the method further comprises the steps of:

simultaneously measuring backscatter radiation on different locations of the sample (1);

determining a physical feature for the different locations; and

calculating a standard deviation of the physical feature.

34. (new) The method according to claim 26, wherein the method further comprises the steps of:

simultaneously measuring backscatter radiation on different locations of the sample (1);

determining a physical feature for the different locations; and

calculating a standard deviation of the physical feature.

35. (new) The method according to claim 29, wherein the method further comprises the steps of:

simultaneously measuring backscatter radiation on different locations of the sample (1);

determining a physical feature for the different locations; and

calculating a standard deviation of the physical feature.

36. (new) The device according to claim 29, wherein the physical feature is a concentration of at least one substance in the medium.